

Castles, every like a castle in effect.

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Then there is perhaps the sole picturesque feature the limestone presents, for its tendency is to wear evenly; you get long straight fells, with tops as level as the coping of a wall, & steep, unbroken sides; & when, as in Buckden Pass above Kettlewell, you are shut-in between ^{such long} fells, it is as if you were imprisoned between colossal walls.

Kilnsey Crag, by Conistone in Wharfedale, the Scars of Giggleswick near Settle, in Ribblesdale, & Malham Cove & Gordale Scar, within Airedale, are very fine examples of limestone scars; but of these it must be admitted that the great dislocation of the limestone, known as the Craven Fault, has had some share in their production. Gordale Scar & Malham Cove, indeed, present some of the finest rock scenery in England: the former has the appearance of an enormous feudal fortress, while Malham Cove presents a great section of a vast amphitheatre, some 200 feet in height, with projecting courses which may represent tiers of seats.

At the foot of the cliff is a low arch, the mouth of a cave, & from this cave issues a clear stream, the infant Aire. But this is not the original course of the river: above the Cove, on the great limestone plateau of Malham, is Malham Tarn, & from this Tarn issues a stream, which flows some half-mile above ground; then, makes its escape through fissures in the rock, eats out a way for itself through the bowels of the plateau, is increased by other underground streams & comes to light again, as we have seen, at the foot of Malham Cove.

Now we have an example of the history of cave-making. Flowing water sinks through fissures of the rock, often partly by erosion, partly by dissolution of the rock substance.

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enlarge the primae, until what was a mere creek
may become an enormous cavern. This is, shortly,
the history of Clapham Cave, Kellin Cave, Weathered Cave,
Victoria Cave, & others less well known, which rank
among the shows of Craven.

The stalactites & stalagmites which frequently adorn
roof & floor of these limestone caverns are formed by
a process simple enough. Water exposed to the air
gives off some of the carbonic acid it contains; the
less carbonic acid it contains, the less calcium
carbonate (limestone) can it hold in solution. Thus, in
a cavern where there is any circulation of air, some
carbonic acid is given off, some limestone deposited
by every drop which falls from roof to floor. A
thin film of limestone remains attached to the
roof, each another film is laid upon the floor, by
every falling drop; & in process of ages, these films
lengthen, increase, take strange forms. We come to
well known stalactites & stalagmites of the limestone
caves.

We have spoken of the loneliness & the remarkable verdure
of the valleys of the limestone; this loneliness is commonly
heightened by contrast with the bare brown moors which
abut upon them. Thus, in upper Wharfedale, we have
Great Wharfedale, Conistone Moor, & Grassington Moor
on the east, at no great distance from the river the
colouring changes quite suddenly, marking a sharp
line of demarcation between verdant & barrenness.
These high moors are of millstone grit, which bears
little wet heather, coarse grasses, ling, crowberry &
bilberry. The flora of the sandstone is poor, with dull
brown tint, with a purple glow when the heather is in
bloom, distinguishes the grit moor at a great distance.

A geological map shows many patches of millstone
grit resting upon the limestone - as Wharfedale, Englethorpe,
Renshaw, Fountains Fell, which are all capped with
grit; while they rest upon the limestone plateau.
We have now to account for the presence of millstone
grit on the high places, & of limestone in the valleys.
The fact is, that the whole country was thickly overlain

with millstone grit, & this millstone grit, with limestone below it to a great depth, have been removed by denudation worn away pretty by the rivers in the act of carving out their valleys. But it is only in the Craven district that the millstone grit has been thus carried off, giving place to the softer landscape of the limestone. In the whole of western Yorkshire, with this exception, we get the scenery proper to the grit; - bold escarpments & rock masses, as at Otley Chevin, & the low stony moor on Rembold's Moor; deep forges or glens, with wooded sides; the timber rather stunted, but various, oak & spruce being the most common; wide, peat-covered ^{the lands of fens,} moors, heaths, sometimes bogs, sometimes - with huge boulders scattered over them, weathered, worn, it mangles, into extraordinary shapes, yielding little to the farmer, even in the lowland. You come upon miserable patches of green water in November - such are the main features of the grit country, which is yet not without its attractions - fine air, & a delightful scene of scenery in the uplands.

Occupying the south-west of the country a geological map usually shows a dark patch, covering a district some 20 miles wide by 35 long, reaching from the extreme south to about five or six miles north of Leeds & Bradford, hemmed in on the east by the narrow Permian Strips we have spoken of, & on the west, by as narrow a strip of millstone grit. Here we have the series of beds known as the Coal Measures. - here, as a consequence, we have a densely populated district, containing all the great manufacturing towns of Yorkshire. Here the sandstone is given & the landscape takes the form where the grit is the surface rock. Brick is rarely used as a building material, public buildings, private dwellings being commonly constructed of the good building stone which the country affords - a fact that gives an air of dignity & prosperity to the manufacturing towns of the West-riding. The bare hills are scarred with many quarries; the region of coal pits & iron

iron-works disfigures the landscape: the streams run black, black as ink, befouled with washings of the dyewoods & other refuse: the atmosphere is dull, laden with the smoke of many mills & many furnaces: the foliage is green, only in the early days of the wet spring. When the coal-field is scored by river-valleys, the unlovely accident-attending manufacturing industries have not quite spoiled the beauty of the country: & even had they done so, this section of the West Riding must needs pay a price for being on the whole one of the prettiest most thriving seats of industry in the empire.

This great coal-field reaches down into Nottingham, but our concern is with that part of it which lies within Yorkshire, - a strip of the 'Lower Coal Measures' upon which stand Leeds, Bradford, Halifax, Huddersfield, bordering the central mass of the 'Middle Coal Measures', whereon are Wakefield, Barnsley, Sheffield, & Nottingham.

Perhaps the best known coals of the Lower Coal Measures in Yorkshire are, the Better Red Coal of Bradford, a bright coal, very free from sulphur, used in working the Low Moor Ironstone.

The latter exists in layers, even more than two feet in thickness, far above the coal seams: perhaps the Low Moor iron owes its celebrity for superior brightness as much to the excellence of the Better Red Coal as employed in smelting & forging it as to the qualities of the ironstone. The Reeston Coal Bed, near Leeds, is another valuable

bed, six feet thick in some places.

Of the Middle Coal Measures, so called as being less deeply buried than the Lower measures, perhaps the most valuable seam is the Lilleshall Coal, reaching from the southern boundary of the County to Cantlow above Barnsley. This is excellent household coal much of which is sent to London. The Middle Coal Measures are so called, by the way, as being less deeply buried

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Having considered the geological formation of the landscape of the West-riding, we can only glance briefly at those of the remainder of the country.

The Pennine strip is as we have said, a long low terrace from two to five miles in width, stretching from the southern boundary of the county to a few miles north of Ripon. Seams of magnesian limestone mark its junction with the millstone grit country in the west & east. It sustains no great seats of industry. Knotborough, Keadleston, Rotherham, are among its towns. When it is cut by the river valleys, as at Throp & Airedale, it is picturesque & lovely, everywhere, it is well-wooded & fertile, being covered with a rich soil which appears to favour the growth of apples. The traveller who has come off the barren millstone grit is surprised to find himself, say between Knotborough & Ripon, in a region of apple orchards & cornfields that reminds him of Hereford.

The Vale of York should give us the scenery proper to the Tertiary formation; but, practically, it is an alluvial valley, overlain with recent deposits laid down by the rivers, & fertile & beautiful as all such valleys are.

East of York, to the north of the Derwent valley, is another picturesque region with wide moorlands, lovely plains, with waterfalls. The moorlands & hills are capped by the sandstone rocks of the oolite series, which form, in fact, a table-land cut through by the streams which fall into the Vale on the one hand, or the Derwent on the other, for here we have a distinct oolite system. The watershed of the oolite extends

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A third industry supported by the Lias is the jet-
manufacture of Whitby: the jet-rock is a kind of
the Lias some twenty feet thick, hard, black, colored
stetumminous. Now the jet-lies in beds, & is
jet-at by making holes in the face of the cliff
at the level where jet should be found, a rather
dangerous occupation. The jet-manufacture
is more curious & interesting than commercially
important: it employs between one & two
thousand persons. Jet is, like coal, a vegetable
product, possibly derived from the remains
of stetumminous droppings of ancient-jiv. wood
The Limestone Stones found in the above shall
furnish to form the industry of this district:
they are prepared for manufacturing purposes
by being calcined ~~in a furnace~~.
The ammonites are the characteristic fossils
of the Lias; they are found in ~~many~~ ^{great} numbers
& of many varieties. ~~They are found in many numbers~~
~~They are found in many numbers~~
Whitby & Scarborough have exceedingly interesting
geological museums, exhibiting the fossils of the Lias.
The coast of England ^{has} presents a fine coast - than
this of Yorkshire, where from Filey Bay northward,
where the cliffs present bold perpendicular faces
to the sea ~~the Lias is capped by the harder~~ ^{being} ~~which~~
which resists the weathering ~~that~~ ^{that} would have
worn away the softer strata. Nettleness, 570
feet; Rockcliff, 660. the Peak, 600. Gristhorpe
Cliff, 800 ft. the Peak Cliff, the Castle Hill
of Scarborough, & the cliff on which Whitby Abbey
stands are all remarkable ~~specimens~~.

The flat fertile Vale of Pickering, the valley of the Don, which separates the Eastern Moors from the chalk hills owes its character to the glacial drift brought down here at a period when northern England lay under such another ice-sheet as within clay covers much of Greenland. Alluvial deposits have been spread upon the glacial clay to a great depth, gradually raising & flattening the valley, making it one of the most fertile districts of Yorkshire. To the south of the Vale we have the long line of the chalk hills stretching inland from Harborough Head, where we enter soft curves, as the chalk hills everywhere are, to the north, the moors end, here & there, in such steep cliffs as we have already seen facing the sea: ~~where the white cliffs are to be seen, & indeed~~ it seems pretty certain that the vale was at one time a bay, which in glacial times, became so choked with drift that the sea was kept out, after the retreat of the ice in some northerly regions.

To the south of the Vale of Pickering is yet the Chalk, which covers, to a depth of 600 feet, a district measuring nearly 60 square miles. Its outer boundary reaches, in the form of a crescent, from Harborough Head to the Humbers, a little to the west of Hull. Here, as in the Downs of the south, we have a gently undulating country, ^{almost} destitute of greenish water, the valleys & the hill slopes supporting heavy corn crops more commonly than the fine close turf proper to the chalk. Sometimes the chalk rises into bold heights, as at Witten Beacon 500 feet above the sea, & Hambley Beacon 530 feet high. Unlike the well capped South Downs

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< The Wolds are almost- desolate places. The few miles of chalk west are greatly worn by the action of the waves into creeks & scars. The few streams of the Wolds are fed by intermittent springs, like the Levants of the South Downs: here, these are called fizzers (hardg). Thin chalk itself is the minerals proper to the chalk.

Holderness, which lies without the chalk crescent we have spoken of, has an interesting geological history.

It is covered with boulder clay, hard & dark, & full of angular fragments of rocks which are found in Cote in Norway, Scotland, & northern England. Geologists are agreed that this boulder clay witnesses to the fact that northern England was, at three different periods, as completely under an ice covering as is Greenland at the present time. But - the boulder clay is pretty overlain by alluvial deposits - peat, sand, &c.; & these are due, not to the glacial period, but to the silting up of the fringe of rivers which originally bordered the coast: of these, Hornsea River is the only one still in existence as a shallow lake. Though it is low, Holderness is not level, except in the south, where there is much marsh land reclaimed from the Humber. The chronological history of this district is not confined to the past: from Bridlington to Spurn Head, the land is retreating before the sea at the rate of two yards a year; that is, a strip some six feet wide is annually carried off from this coast. Towns, villages, churches, & parsonages, have been carried away bit by bit, & Ravenesburgh, the port where Henry of Bolingbroke landed to claim the crown, has been lost bodily, leaving no more than a summit that it stood somewhere near Spurn Point. Spurn Point itself, with the ridge which connects it with the mainland is but a sandbank, but within the Point, new lands are being laid down, formed of the material which the sea has stripped from the coast together with the mud brought down by the Humber. The rich mud flats thus laid down are of great interest as showing stable land in the very process of making.

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The Mountains of Yorkshire.

The mountains near north of Ribblesdale has
thirty summits above 2,000 feet in height.
Of these, Mickel Fell, 2,150 ft. is the highest in the
county; it is not entirely a Yorkshire hill, as was the
summit runs the boundary line between Yorkshire
& Lancashire. To the south of Mickel Fell the
land sinks into Stannmore, a broad flat more
with rugged heights and, beyond Stannmore
is the great mountain plateau of western Yorkshire
rising into many ridges & fells, where the Wharfe,
Swale, Ure, Rye, & Aire all have their
sources.

All this is contained in the triangle formed by
Arden, Ribblesdale & Swale, & a vast tract of
fifty many miles by rich & fertile soils, running
east-west, where are the famous Airedale
& Ardenale lead mines - on these moorland
fells exceeding 2,000 feet. Boggan Seat, Water
Crags, & Pair Seat.

Following the Swale up to its head, we come to a very
stony region - a semi-circle of moorland fells
including Rye Claverton, High Seat, Lady's Riller
&c., forming the eastern side of the stony
pass of Malpasbury, which has been quarried
in the neighbourhood of the town.

Between Swale & Aire is the Battersdale
- running to the west between Malpas & Skipton
Pass, with lovely lead & limestone hills on either
hand, both mountains of great fells in themselves
but of very stony views of the mountains
around the coast.

Kiddal Fell, commonly called the
Caldew Fell, a noble somewhat isolated hill
with

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with a glorious view of Wensleydale, or the base
of the summits of the North Wharfedale as has been
~~noted~~ ^{noted}.

Of the more picturesque mountain region of the West
riding it is necessary to speak more in detail.

Longfild Hills, in the extreme west-corner of the county,
partly in Wetherhamshire & cut-off from the rest
of Yorkshire by the lovely Linn valley, belongs
to the glaciated hills of the Lake Country, & presents the
rolling broken aspect of the Cumbrian mountains
rather than the rounded & straight outline of
the limestone & gritstone fells.

Still within the ^{picturesque} ~~scenic~~ strip of the country -
those marriage fells into the Great Lee, we have
the long straight fells which shut-in Garsdale &
Sedburgh, with the valleys of fountains of the Linn.
Sedburgh, on the Beaulieu of Yorkshire, is a more

ravine ~~in the valley~~ between transverse ridges
running east & west. The traveller by the Great
Northern line between Settle & Carlisle crosses
the mouth of the valley: a break occurs in the
wild landscape of moor & mountain. ^{at the gap}
discloses itself a long valley more beautiful
green, yet running than the vale of St. John.
~~There is a halt at a station which calls for~~